

HISTORY AND LORE OF SESAME IN SOUTHWEST ASIA¹

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Bedigian, Dorothea (*Department of Biology, Washington University, St. Louis and Missouri Botanical Garden; e-mail dbedigian@yahoo.com*). HISTORY AND LORE OF SESAME IN SOUTHWEST ASIA. *Economic Botany* 58(3):329–353, 2004. The purpose of this work is to present a botanical, cultural and historical portrait of sesame use in Southwest Asia, from earliest time to the present. The crop's domestication and subsequent dispersal are reviewed from the archaeological literature and early texts. The introduction of sesame represents an agricultural innovation in Southwest Asia, since as a 'tropical' warm weather crop, sensitive to freezing temperatures, it is successfully grown in the region as a summer crop, by selecting cultivars that mature early. Its seeds are used as food and flavoring. The chief constituent of the seed is its prized oil, 45–60 % by weight that resists oxidative rancidity. It is used as a salad or cooking oil, an ingredient in cosmetics, in the manufacture of soaps, pharmaceuticals, and lubricants, and was formerly used as a lamp oil. The press cake remaining after the oil is expressed is a nutritious livestock meal. Information about medieval cultivation practices and evidence of its use in early centuries is extracted from historical manuscripts. Examples of sesame in art, myth, proverb and riddle from Southwest Asia provide a comparative, cross-cultural view of its service as a symbol. A survey of culinary, medicinal and linguistic data is presented. The status of its cultivation in the last century is represented by a rare look at practices in Armenia, Syria and Yemen.

L'HISTOIRE ET LE SAVOIR DU SÉSAME DANS LE SUD-OUEST ASIE. Ceci est un portrait botanique, culturel et historique d'utilisation de sésame dans le sud-ouest Asie, du temps le plus ancien jusqu'au présent. La domestication de culture agricoles et la dispersion suivante, est passée en revue de la littérature archéologique et des textes tau temps jadis. L'introduction du sésame représente une innovation agricole, puisqu'elle est une culture de temps chaude, sensitive aux températures de congélation, mais est avec succès développée dans la région comme culture d'été, par le choix des cultivars qui mûrissent le plus tôt. Sa graine est employée comme nourriture et assaisonnement. Le constitutif en chef de la graine est son huile estimée, 45–60 % en poids qui résiste à la rancidité oxydante. Il est employé comme une huile salade ou de cuisine, un ingrédient en produits de beauté, dans la fabrication des savons, des pharmaceutiques, et des lubrifiants, et a été autrefois employé comme huile de lampe. Le tourteau restant après que l'huile soit exprimée, est un repas nutritif de bétail. Des informations sur des pratiques culture lles et l'évidence médiévale de son utilisation en siècles tôt sont extraites à partir des manuscrits historiques. Les exemples du sésame dans l'art, le mythe, le proverbe et l'a devinette fournissent une vue comparative et transculturelle de son service comme symbole. Un enquête sur les données culinaires, médicinales et linguistiques est présentée. Le statut de sa culture en dernier siècle est représenté par un regard rare aux pratiques en Arménie, en Syrie et au Yémen.

Key Words: Arabia; Armenia; Mesopotamia; oil plant; Persia; sesame; Syria; Tutankhamen; Urartu; Yemen.

An earlier report in this journal (Bedigian and Harlan 1986) reviewed the "Evidence for Cultivation of Sesame in the Ancient World." New recoveries from archaeological excavations require that the citations be updated, since there were no known records of seed remains from

Mesopotamia or ancient Egypt in 1986. Additionally, this survey continues forward in time through the medieval period to the modern day, adding historic records about sesame culture from those eras, and communicates findings from the author's recent ethnographic fieldwork in Armenia, Sudan, Syria and Yemen.

Since the Early Bronze Age, the sesame plant has been closely linked with the traditions of Southwest Asia. Brought to Mesopotamia in an

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early period, by 2500 B.C. archaeological sites there contain sesame. This report follows the sesame seed to explore some complex cultural transactions between Southwest Asia, Africa and the Indian Ocean world, overland and by navigation. This research exposes the multidirectional traffic throughout Southwest Asia by using interdisciplinary sources to process the geography and the history of botanical exchange.

The boundaries of Southwest Asia examined here include Northern Africa, applying ICARDA's geographic designation WANA Region [Western Asia/Northern Africa] (Furtado, van Schoonhoven, and Hamed 1995). This article includes data from Afghanistan, Armenia, Egypt, Ethiopia, Greece, India, Iran, Iraq, Israel, Jordan, Lebanon, Morocco, Pakistan, Palestine, Saudi Arabia, Sudan, Syria, Turkey and Yemen.

Writers (Damania 2002; Joshi 1961; Mabberley 1997; Weiss 1971) routinely describe sesame as the oldest plant used as an oilseed. Sesame was grown during ancient Harappan, Mesopotamian, and Anatolian eras for its edible seed and its oil. While archaeological remains of flaxseed date to earlier periods (Zohary and Hopf 2000), we cannot distinguish whether those earliest seeds were used for food or for fiber.

NOMENCLATURE

Sesamum orientale L. is often listed as a synonym of *Sesamum indicum* L. (Pedaliaceae). However, the correct scientific name has been a matter of uncertainty for decades (Manning 1991). Seegeler (1989) has made a strong case for the use of the name *S. orientale* for this species. The Tropicos database from the Missouri Botanical Garden has also upheld the name *S. orientale*. However, Nicholson and Wiersema (2004) have proposed conserving the name *S. indicum* over *S. orientale* in a recent article in the journal *Taxon*. The overwhelming numbers of references that Nicholson and Wiersema retrieved using '*S. indicum*' in contrast to '*S. orientale*' in broad database searches are persuasive. A survey of all the references cited here confirms that every article uses *S. indicum*, except for those that note the synonymy.

In some of her previous publications, the author, following what was then the most commonly applied binomial for sesame, referred to this species as *S. indicum* (Bedigian 1984, 1985, 1988, 1991, 1998, 2000; Bedigian and Harlan 1983, 1986; Bedigian, Seigler, and Harlan 1985;

Bedigian, Smyth, and Harlan 1986). In more recent articles, however, the author has adopted Seegeler's 1989 recommendations; and, thus, applied the name *S. orientale* for this species (see Bedigian 2003a,b). Nevertheless, the question remains open. The conservation of a name has to be approved by a vote of the nomenclature committee of an International Congress of Botany (ICBN). Until that event happens, the name for the species remains the earliest published one, i.e., *S. orientale*. There is no guarantee that this International Congress will accept Nicholson and Wiersema's proposal. Therefore, until official action has been taken on the status of this species' name, and except where it appears in direct quotes, the name *S. orientale* must take precedence over *S. indicum*.

BOTANICAL DESCRIPTION

Sesamum orientale is an erect annual of variable size, with mature plants ranging from 40 cm to over 200 cm in height. Its stems are obtusely square with grooves on their faces, yellow-green but often splashed with varying amounts of a striking deep eggplant-purple color. Plants are often highly branched, with as many as 26 stems, depending on the variety. Other cultivars are unbranched. The leaves are typically bluish green, paler with more gray below, nerves sunk above and raised below. Their basal leaves are deeply divided, 3 or occasionally 5 foliate, with dentate margins. The campanulate flowers (Fig. 1) are usually solitary, each borne at a node, with a yellow gland, extrafloral nectary, at each side. The calyx is pale green, sometimes with a purplish tinge, especially at the lobes. The corolla is pale mauve inside, and may be a deeper shade outside on the conical tube and frequently on the lowest, middle lobe. This lobe is longer than the rest, roughly 1-cm long, and its color varies from pale to deep purple. Some cultivars have dark coloring on the entire lobe, while other cultivars show slight color at the edge. Behind this lobe, inside the tube at the foveola, is a pale sulfur yellow zone, and behind that, fine purple dots on a pale mauve background cover a second yellow zone, half way down the tube. The filaments and style are white, anthers light brown, and pollen white. The fruit are capsules, usually bicarpellate, but some cultivars are tetracarpellate.

Sesamum orientale shows physiological variation, e.g. days to maturity ranging from 70 to



FIG. 1. A sesame plant (*Sesamum orientale* L.) in flower.

180, as well as morphological differences in pubescence, leaf shape, seed color and overall plant color (Bedigian 1984, 1988, 1991, 2003a,b; Bedigian, Smyth, and Harlan 1986). Some Turkish cultivars and many cultivars from India display a purplish hue. A distinctive royal purple-tinted type is found in India, nearest the center of origin, adhering to the Vavilov effect postulating that the variation remains closer to the wild type, and more dominant genes are expressed near the center of origin (Harlan 1995). Farther from the center more recessive genes are expressed. Korean cultivars, for example, are very dissimilar: unbranched or with only a few branches, a light yellow-green color, little pubescence, strap-shaped leaves, and leaf margins with little or no dentation.

Plants in the genus *Sesamum* produce unique chemical constituents that enable sesame oil to resist oxidative rancidity (Cooney et al 2001; Ikeda 2001; Shyu and Hwang 2002). This fact might contribute to its reputation as high quality oil, earning sesame the label “Queen of the oil-seed crops” (Al-Yemeni, Hussain, and Basahy

2000; Bedigian 2000; Eckey 1954). These compounds, sesamin and sesamolin, belong to a category of phenylpropanoid lignans that occur in few other plant groups.

Sesame is well suited to high temperatures and limited rainfall. It tolerates heat above 40°C, and will grow with as little as 300–400 mm rainfall, provided the soil is fairly fertile. It will also grow without rain falling during growth, depending solely on the stored moisture from winter rains (Weiss 1971). It is daylength-sensitive.

DOMESTICATION

It is now well established that sesame was domesticated in India and was taken to Mesopotamia by the Early Bronze Age (Bedigian 1984, 1985, 1988, 1998, 2000, 2003a; Bedigian, Seigler, and Harlan 1985; Bedigian, Smyth, and Harlan 1986). Researchers in India, most recently Hiremath and Patil (1999), confirmed these results with reciprocal crosses and cytology. Bhat, Babrekar, and Lakhanpaul (1999) and Nanthakumar, Singh, and Vaidyanathan (2000) used RAPD markers to demonstrate the proximity between *S. orientale* and its progenitor, *S. malabaricum* Burm. Their results support the conclusions previously reported by this author that were favorably reviewed in recent summaries about centers of origin (Damania 2002; Fuller 2003).

INDUS CIVILIZATION: THE SOURCE

Bedigian (1985, 1998, 2000, 2003a), Bedigian and Harlan (1986), Fuller (2000, 2003), Fuller and Madella (2000) and Zohary and Hopf (2000) offer reviews of the evidence. The oldest remains of sesame seeds were found at the Indus Valley civilization site of Harappa (Vats 1940) in Pakistan, where excavators uncovered “a quantity of lumped and burnt *Sesamum*.” It is now accepted that Vats’ material at Harappa came from levels that fall into the Mature Harappan phase, dating to 2600/2500–2000 B.C. (Kenoyer 1991; Possehl 1997; Shaffer 1992).

Sesame had been domesticated by this time, confirmed by its presence by the 3rd millennium in Mesopotamia (Charles 1989), thus making the identification of sesame with “oil-plant” in Sumerian literature plausible (Postgate 1985; Zohary and Hopf 2000). Weber (1991) did not include sesame among the finds at Rojdi, but he indicates in Table 10.1 that sesame was first found in the “Indus Valley Core Area, Mature

H" phase that he attributes to c 2600 B.C., and that sesame was planted as a summer crop. Allchin (1969) suggested that a relic of sesame's Harappan antiquity was its name, *tila*, given to all kinds of oil (*tel*).

Recently there was a discovery of a small quantity of well preserved charred sesame seed in Miri Qalat and Shahi Tump, Markan region, Pakistan, in contexts dated to the second half of the 3rd millennium B.C. (Tengberg 1999). In summary, there is general agreement that the earliest finds date to c 2600 B.C..

DIFFUSION TO BRONZE AGE MESOPOTAMIA: EXCAVATED SEEDS

Charles (1993, 1994) revisited ash tip plant remains from Abu Salabikh [excavated 1978] to find sesame seeds dated to the middle of the third millennium B.C. in Mesopotamia.

Van Zeist (1994, 1999) reported that six damaged sesame seeds were recovered from a 13th century B.C. sample from Late Bronze Sabi Abyad [1550–1250 B.C.] Tell Balikh, Northern Syria. Two contexts at Tell Schech Hamad, on the Khabur of northeastern Syria, yielded evidence of sesame. One seed was retrieved from a 13th century B.C. sample and a few more from a 7th century B.C. context (van Zeist 2001).

BRONZE AGE MESOPOTAMIA: TEXTUAL EVIDENCE

Cuneiform texts from 2400 B.C. onwards mention an oil plant which on etymological grounds is identified as sesame (Bedigian 1985, 1998, 2000; Bedigian and Harlan 1986), although the decipherment of Akkadian *šamaššammū* has been disputed for many decades. Although the concluding view in the *šamaššammū* article prepared for the Chicago Assyrian Dictionary [CAD]'s "Š" volume (Reiner 1989) was that the word should be translated as 'flax,' it nevertheless contains several texts that support the identification of *šamaššammū* as sesame.

Powell's subsequent (1991) validation of Bedigian's contributions arguing in favor of interpreting *šamaššammū* as sesame opens up the vast literature from Mesopotamia that gives much textual evidence to indicate that sesame reached Mesopotamia by 2350 B.C.. This was not long after its domestication and expanded cultivation in Harappa. An OB text concerned with processing the seed says: "it came to 90 gur of *šamaššammū* before it started raining. I

managed to crush 40 gur of it and the rain did not arrive to ruin it" (Dossin 1933). Mesopotamia's rainy season starts in autumn, hence the text clearly refers to a summer crop that was harvested in the fall. The texts reported earlier (Bedigian and Harlan 1986) in the CAD article (Reiner et al. 1989) contain many references to oil pressing, and these can now confidently be considered as descriptive of sesame processing.

HARVEST METHODS

A claim put forth at the Sumerian Agriculture Group's 1984 meeting [focused on scholarship to distinguish sesame from flax] argued against identifying sesame as the ancient oilseed, based on a text that described the harvesting of *šamaššammū* by uprooting the entire plant. Some participants reasoned that flax alone is harvested in that way. However, the author's recent fieldwork (Bedigian 1998) and newly discovered publications reveal that sesame, too, is regularly harvested by pulling the plant. Interviews with farmers took place in Syrian villages along the Euphrates located between 100 km north of Deir Zor and 100 km south of Deir Zor, and in the 'Gezira' area of northeastern Syria, in May 1997, September 1997, August 1998, June 2001, and September 2001. Conversations about and scrutiny of the previous year's dried sesame stalks saved for kindling revealed that more than 85% of the villagers harvest sesame by uprooting the entire plant.

This practice was also common in Turkish Armenia before 1914 (Bedoyan 1972; Halajyan 1973). An early account from Syria, Lebanon and Palestine (Cuinet 1896) states that plants were harvested by pulling them up, then shocking them, and, when ripe, the shocks were turned over and the seeds fell out. Excavator Zohrab Kassabian, of the Urartian site Karmir Blur (pers. comm. 2001) interviewed a number of sesame farmers in Armenia in 1957, who indicated that they harvested their plants by uprooting. Note that the practice of uprooting is not typical. The more widespread practice is to cut the stems with a knife and gather them into bundles that are stood upright in the field until they are dry (Bedigian and Harlan 1983).

AGRICULTURAL INNOVATION: SESAME AND MILLET, SUMMER CROPS

DIFFUSION TO IRON AGE URARTU SITE KARMIR BLUR: EXCAVATED SEEDS

The archaeological literature shows that sesame arrived in Mesopotamia during the middle

of the 3rd millennium B.C. and became a staple in the region. Millet was introduced to Iran by the Late Bronze Age and went from there to the rest of the Near East by the Iron Age (Nesbitt and Summers 1988). Its use spread by the Iron Age to the Kingdom of Urartu.

Four large jars containing carbonized sesame seed were uncovered at Karmir Blur [ancient Teishabaini] (Kassabian 1957; Piotrovskii 1966) at the outskirts of Yerevan, the northern realm of the kingdom. They were dated between 900 and 600 B.C.. The site also contained elaborate installations for the extraction of oil from the seed (Piotrovskii 1950, 1952). Kassabian's site report (1957) revealed that a 60-room workshop held 2-m tall amphorae containing sesame seeds. Stone mortars and pestles for crushing seed, and channels carved from tufa, a soft volcanic stone, directed the oil into containers, and the wastewater outside the compound (Bedigian 1984, 1985, 1998, 2000; Bedigian and Harlan 1986). Sesame recovered from the Urartian kingdom's Bastam in northwest Iran (Hopf and Willerding 1989) dates from the same era.

URARTU'S AGRICULTURAL INNOVATIONS AND ECOLOGY

The arid environmental conditions of northern Mesopotamia may well have encouraged agricultural innovations as adaptive responses. Introduction from abroad of sesame and millet, drought resistant tropical crops, represents not only new introductions to the traditional suite of Near Eastern winter-grown crops including barley, wheat, lentil, chickpea, pea, bitter vetch and flax, but a change to the agrarian system. Tolerant of drought and fast maturing, millet and sesame allowed inhabitants to extend the growing season into the fierce heat and dry summer conditions of the highland plateaus and parched plains, as well as by irrigated cultivation, in the river corridors. Theophrastus (*Enquiry into Plants* 8.1.2; 8.1.4; 8.2.6) identified sesame as one of the main summer crops of his time along with millet and Italian millet, *erysimon* and *horminon*, in the fourth century B.C. (Bedigian 1985; Bedigian and Harlan 1986; Gallant 1985).

An eyewitness reporter from as early as the first century A.D., Pliny (*Natural History* 18.10.49) stated, correctly: "[S]esame comes from India," and it is a summer grain to be sown before the rising of the Pleiades. "We have specified *gingelly* [*Sesamum*] and common and Ital-

ian millets as summer grains." Mortimore (1989) substantiates the popularity of millet because of its ability to yield well with little rain. Short season cultivars of sesame are characteristic of Turkish material grown even today (Bedigian 1984; Bedigian, Smyth, and Harlan 1986). Zohary and Hopf (2000) include sesame in the category of 'warm-weather crops', and they view broomcorn millet (*Panicum miliaceum* L.) and foxtail millet (*Setaria italica* (L.) Pal.) as the earliest such arrivals from central and/or East Asia, but later than sesame.

Zimansky (1985) described the ecological conditions in Urartian lands, relying on a 19th century eyewitness' observation about Khvoy, an area in neighboring Iran, praising the "fertility of the lands which surrounded it, praising both its gardens and its grain-growing capacities. This productivity, which is still manifest, is not due to any abundance of moisture—Khvoy is the driest meteorological station on what was once Urartian territory . . . A relatively damp May, early-maturing crops, and irrigation water from the Qoṭūr—which has its sources above the 2400 m level in the mountains 53 km E of Van—are what make agriculture possible here."

Regarding "Erevan and the plain of Ararat" between Mt. Ararat and Aragac, the eyewitness wrote: "The Aras plain broadens to a width of more than 35 km, creating the greatest single expanse of arable land in Urartu's domains. The Aras itself splits into several channels to water this plain, and other rivers from the surrounding mountains supplement it in this task . . . The mountains north of the valley, however, enjoy considerably more precipitation than those in more southerly parts of Urartu, and consequently more water from runoff is available to the cultivators of the valley."

DIFFUSION TO IRON AGE DEIR 'ALLA: EXCAVATED SEEDS

Some 200 sesame seeds dating from about 800 B.C. were uncovered in Iron Age beds at this site in Jordan (Neef 1989).

DIFFUSION FROM THE INDUS TO SOUTHWEST ASIA AND AFRICA: EXCAVATED SEEDS

Charred sesame seed in abundance was found in the storeroom at the site of Sabir, situated on the Wadi Tuban on the coastal plain of south Yemen, 25 km north of Aden (Moulins, Phillips,

and Durrani 2003). The site has been dated from the 14th to the 9th century B.C..

India had occupied a unique position in the commercial world as an important supplier of luxury goods since earliest time (Mookerji 1912; Possehl 1998; Ratnagar 1981). Hawkes (1976) indicated an active trade in beads, very high quality pottery, glass, carved stone seals and metalwork between these regions. She wrote that between 5000 and 3000 B.C., peoples from Mesopotamia influenced the Eastern Mediterranean, Levant and Anatolia. She reported trade overland and via the Gulf by 2100 B.C.. "Traders had contact with both Sumeria and the Indus valley, Bahrain and Oman. Based on an efficient agriculture and active trade, by 3000–2000 B.C. Sumerian civilization reached its peak."

Travel and trade on the Indian Ocean was described by an anonymous merchant of the first century A.D. in the *Periplus of the Erythraean Sea* (1912). "Ships customarily fitted out from places across this sea, from Ariaca and Barygaza, bringing to these far-side market towns the products of their own places; wheat, rice, clarified butter, sesame oil, cotton cloth and girdles, and honey from a reed called *saccharum*. Sesame oil was traded along with cloth and wheat, for frankincense." Note that it was oil extracted from the seeds that was exported.

DIFFUSION TO ANCIENT EGYPT

Serpico and White (2000) present a thorough synopsis of the finds that are examined here. They uphold the views of this author about origin and diffusion, stating that the "possibility that sesame was introduced to Egypt from eastern Africa is still more difficult to support."

KING TUTANKHAMEN'S TOMB: EXCAVATED SEEDS

The earliest unmistakable sesame seeds from an archaeological context in Egypt were found buried in King Tutankhamen's tomb (c 1350 B.C.). The rediscovery of sesame seed associated with the burial of King Tutankhamen (Vartavan 1990) pushes back the date of the earliest record for sesame seeds in Africa. These seeds were rediscovered among the inventory in 30 boxes of plant remains that were stored at the Royal Botanical Gardens, Kew, and botanist Leonard Boodle was in the process of cataloging them until the time of his death in the 1930s. Graduate student Christian L. T. de Vartavan was permit-

ted to go through the boxes to examine their contents.

Vartavan sent the author a sample of the seeds for verification in 1988, coinciding with a visit to Washington University, St. Louis, by Jack Harlan. Both were convinced that the specimen is sesame. The seeds are uncharred, slightly smaller than average in size, but within the range of variation for cultivated material. While these seeds do not provide evidence of cultivation in Egypt because they may have reached Egypt by trade, they show that sesame was present in Egypt by the time of King Tutankhamen, and valued as a suitable offering in the royal grave.

Regarding the context of the finds, Vartavan wrote: "60 ml of sesame seeds were found in an oval shaped reed basket, one of the 116 reed baskets containing seeds and fruits, in a room filled with food, drinks, ointments, perfumes and oils." Vartavan viewed these seeds as "the most striking find" among the remains in the room designated by Howard Carter as the 'Annexe' to Tutankhamen's tomb (Vartavan letter dated July 20, 1988).

EGYPTIAN MEDICAL TEXTS

According to Lucas (1962), the earliest Egyptian textual reference to sesame dates from 256 B.C.. Both sesame and sesame oil are mentioned in the Tebtunis Papyri 3 (Part 2, No. 844). *Select Papyri* (Hunt and Edgar, 1932) mentions sesame paste, oil and seeds. Deines and Grapow (1959) indicate that sesame was used as medicine. Weiss (1983) cites the Medical Papyrus from Thebes, 1552 B.C., a list of herbal remedies, including sesame oil and seeds.

CLASSICAL PERIOD

ARMENIAN AND PERSIAN USE OF SESAME

Xenophon (1901) documented the cultivation of sesame in ancient Armenia in the fifth century B.C.. He stated in *Anabasis* (IV.iv.13): "In (western Armenia). . . there was a scented unguent in abundance that they used instead of olive oil, made from pork fat, sesame seed, bitter almond and turpentine. There was a sweet oil also to be found, made of the same ingredients." Xenophon located sesame in two other parts of Anatolia: Cilicia—"[t]his plain produces sesame plentifully, also panic and millet and barley and wheat" (i.ii.22)—and "Calpe Haven in Asiatic Thrace," farther west. "Calpe lies exactly mid-

way between Byzantium and Heracleia,” has “good loamy soil. . . produces barley and wheat, pulses of all sorts, millet and sesame, figs in ample supply, numerous vines. . . indeed everything else except olives.”

Kennett (1975) noted that “During the reign of Sargon, the price of sesame oil was kept artificially at the same level as grain, because both were equally essential to the people. But by the reign of Assurbanapal [668–626 B.C.] sesame cost nearly four times as much as grain, because demand was so great. Pomades for careful barbering, perfumes, unguents, fumigants and even soap, with various fragrances, were common among all classes.”

GRAECO-ROMAN ERA

Sesame was cultivated extensively in the Graeco-Roman world, more for its edible seed than for its oil. The writings of Greek travelers and historians provide some clues to the cultivation of sesame in the ancient world. These records make it clear that sesame was well known in Mesopotamia by the time of the Iron Age. Herodotus (*History* I:193), in the fifth century B.C., observed that the only oil the Babylonians used was from sesame. At roughly the same time, Aristophanes (*The Eleven Comedies* 1930) refers, in several of his comedies, to confections and cakes made of sesame, in some colorful scenes that were excerpted earlier (Bedigian and Harlan 1986).

Columella (1941), like Theophrastus, identified sesame as a summer crop: “But I have seen this same seed sown in the months of June and July in districts of Cilicia and Syria, and harvested during autumn, when it was fully ripe” (*On Agriculture* 2.10.18). Pliny wrote that a large amount of oil in Egypt was obtained from *gingelly* (*Sesamum*) (*Natural History* 15.7.31). Cappers (1999) and van der Veen (1999) count sesame among the plant foods recovered in Egypt during the time of the Roman Empire. Their data support the assertion by Kajale (1991) that plants such as cinnamon, white pepper, long pepper, black pepper, ginger grass, spikenard, costus, indigo, lemon grass and sesame were being exported from India into the Roman Empire during the early historical period.

Levey (1966) wrote that in the Babylonian medical literature, sesame was used for swellings, blows, scabies, and for the muscles of the

arms and legs. Dioscorides’ Herbal (Gunther 1934) reported: “purgeth phlegm and choler.”

MEDIEVAL PERIOD: HISTORY, MEDICINE, MYTH AND RELIGION

A review of 7–13th century A.D. finds from Syria and Iraq and a critical discussion of earlier records from the ancient Near East and Egypt are presented by Samuel (2001).

ZAKAT ON SESAME

Imaam Malik [713–797 A.D.], the second scholar to establish one of the four major schools of *Figh* [Jurisprudence], offered the opinion that *zakat* must be paid on sesame. *Zakat* or *zakah* is the fifth pillar of Islam. Any person who has *zakatable* produce must pay it. The amount on which *zakah* is due varies with the commodity. If agricultural products (grains, legumes, dates, and other staples) are artificially irrigated (i.e., not by rainfall or flood), 5% of the yield should be given as *zakat* on harvest day; if naturally watered, then 10% is due.

MEDIEVAL ARAB MEDICAL SOURCES

Al-Kindi (Levey 1966) [d. 870 A.D.] indicated that sesame was employed for a middle ear inflammation, and in a drug for leprosy. The oil, *shīraj*, was used in a poultice to excise an abscess, a drug for toothache, a cough remedy, in a clyster, for numbness, and in a black remedy for insanity.

Ibn Sina’s [980–1037 A.D.] *Al Qanun Fi’l-Tibb* (1987) reported that sesame has the highest oil content among seed crops; has laxative quality; tends to have viscous oil; is useful in treating cracking and rough skin; is fattening. Its oil and the juice extracted from its stems and leaves help hair grow and eradicate dandruff. Oil can be applied on burns and mixed with aloe infusion and raisin juice taken internally to eradicate itch. The oil treats joint stiffness. Its oil mixed with madder (*Rubia tinctorum* L.) flower relieves burning headaches; the oil treats eye throbbing and swelling. It is good for asthma and other ailments causing difficulty in breathing. It kills the appetite and satisfies hunger quickly. It is slow in digestion and loosens the bowels. A mixture of roasted sesame seeds and either poppy or linseed, eaten in moderation, increases semen production and sexual stamina (aphrodisiac) [translation by El Siddig At-Taras 2002].

Al-Samarqand [d. 1222 A.D.] (Levey and Al-Khaleedy 1967) listed sesame as an ingredient for making poultices, with fat from the hump of a camel, oil of rose, myrtle, violet, nenuphar, clove, fat of chicken and duck, marrow of leg of cow, and butter.

Ibn al Baytar [1240–1248 A.D.] wrote his *Treatise on Medicine* in Damascus (1877–1883). Citing Abou Hanifa, he described two forms of *djoldjolân*, sesame: white and black. It was very common in Cherat and in Yemen. He summarized the corpus of therapeutic insight about sesame contained in the following sources that were available to him:

Ibn Massouih: Laxative. Used against chapped feet and body roughness. Its oil and residue used with decoction of myrtle and omphacine oil, cures itching caused by overheated blood or the salted pituitary, especially if one takes this oil with a solution of aloe and dry decoction of grapes stripped of their skins. The measure is two ounces decoction of dry grapes and an ounce and a half of sesame oil. Employ by fasting, with one ounce of anise.

Masserdjouih: Sesame decoction is emménagogue and abortive. Roasted sesame taken with linseed is aphrodisiac.

Razès, in the *Continent*: Sesame oil is appropriate against chapping of limbs and body; its internal use is excellent in that it slackens shrunken limbs and softens them.

Razès, in his *Treaty of Correctifs of Food*: One corrects the nauseous properties of sesame and one hastens digestion by consuming it after garum.

El-Basry: Peeled and roasted, sesame is a good food.

Ishak ibn Amran: It aids in the afflictions of the chest and lung, and against cough. Prepare soothing emulsions and potions. Inject its oil in a blocked ear.

El Sherif: If one mixes sesame oil with as much wax and employs it topically, one slackens the contracted face, one softens it, one clears it up and one tints it. One successfully practices this application against chapping of the anus.

Book of Experiments: Sesame oil, for internal as well as external use, against dry excoriations. It softens the induration of the tumors. If one beats fresh oil with a slightly cooked egg and applies it to the eye, this is advantageous topically against tumors and it calms pains; it also

hastens the maturation and the opening of hot abscesses.

Avicenna: It is salutary against asthma and dyspnea. It depresses the appetite. With its testa, it passes quickly; hulled, it passes more slowly.

El Ghafeky: Sesame fights irritation in the stomach caused by bitter moods, ingestion of wine or irritating remedies. Its oil is useful against tinea. Prolonged use as food with bread helps against thoracic ulcers and dryness. The translation of Dioscorides into Arabic adds this note with the name of Ibn el Beithar: "It is the *djoldjolân*. Its oil is the oil of *hal*. It is the *sîredj*, and the *selîth*, among inhabitants of Hédjaz and Yemen."

Abou Hanifa: *Djoldjolân* is sesame. It is soft, native of Arabia, one white and the other black. It is very common in Cherat and in Yemen. The Arabs name this oil *salith*. Its name is *simsim*.

Dā'ūd ibn 'Umar al-Antākī [d. 1599] *Medical Treatise*: Sesame dissolves kidney stones, is good for cough, soothes rashes, takes away halitosis, treats snakebite, lengthens hair and darkens it, is skin emollient, and sesame leaves mixed with acid are abortifacient. Eating a mixture of sesame and poppy seeds makes one fat. It is heavy for the stomach, hard to digest, obtains a 'hot' classification, so it produces headache, but honey can take the headache away [translation by Salah Abdallah Al Yarimi in Sana'a, Yemen, 1998].

ARMENIA

ANI, MEDIEVAL BAGRATID CAPITAL OF ARMENIA IN THE YEAR 1000

Hewsen (2001) reports that Ani, with its monumental stone cathedrals, was the flourishing capital city of the Kingdom of Greater Armenia that reached its apogee in the reign of King Gagik I (989–1020). At that time only Cairo and Baghdad surpassed Armenia in importance. Kamsarakan (2001) reported that an active sesame seed crushing industry existed in Ani, where an oil mill has been excavated.

CHURCH RITUAL USE

Catholicos Nerses Shnorhali's General Cyclical (1871) contains the official correspondence of Catholicos Nerses Shnorhali [1100–1173 A.D.]. During the 12th century, the Armenians of the day used sesame oil to prepare the holy anointing oil, *miwron*, applied during baptisms and weddings. During that period, the Greeks,

desiring to promote their orthodoxy and attempting to recruit converts to their church, sent a letter criticising the Armenians for their substitution of sesame oil for olive oil in preparing *miwron*, as an incorrect deviation from the rules. *Miwron* is a distillation product of 48 botanicals [flowers and resins] that is fermented with wine and oil for 40 days (Bedigian 2003c). Prayers and ceremonies sanctify the process, and as a final step, a 'starter' of anointing oil from the previous batch is added and the mixture is consecrated and distributed to every church.

Sesame oil must have been locally abundant and highly regarded for its purity and beneficial qualities, leading to this replacement. Catholicos Nerses Shnorhali's reply in the *Cyclical* explained that there was no disrespectful intent, but that in Armenian lands no olive grows because of the severely cold winters, so it was necessary for them to use whatever oil plant was available to them. From a spiritual point of view, it was harmless, because the power resided not in the substance, but in the heavenly blessing. It made no difference whether the fruit of a tree or from an herb was used, just as the color of the wine used in the fermentation process is unimportant, as all wine symbolizes the blood of Christ, regardless of its color.

ARMENIAN MEDICINE

A compendium of medical *Consolations* (Devzian 1832) includes these 12th century formulations: Chickenpox rash is soothed, and a child's scrape is treated, with an application of dried dove's feces mixed with sesame oil, forming a paste that is applied to the wound or irritation. When this cream dries, no scar will appear. Blend rosewater, an aqueous extract of sumac and pomegranate juice, with sesame oil. Drops placed in the eye remedy a sty.

Basmadjian (1926) reissued *Amirdovlat*, the complete prescriptions of a 16th century Armenian physician to Suleiman the Magnificent that were used in Persia at that time. His advice: Fresh seeds are better. The seeds are hot and damp [1st degree]. Relaxes tense muscles. Softens hardness [laxative]. Sesame leaves boiled in water and used as a shampoo lengthens and strengthens the hair. If the head itches, this soothes the itch. Strengthens the brain. Relieves cramps. Seed strengthens sperm. Relieves cough. Opens sore throat. Increases milk production. Toasted seeds relieve nausea. Helps re-

lieve menstrual cramps. Abortifacient. Fattening. Oil relieves skin dryness—emollient. Reduces swelling. Irritates stomach. Better if eaten with honey. White opium can be substituted for sesame.

Basmadjian restated what scholar and Sufi theologian Al Ansari [1006–1089 A.D.] had written, that sesame oil massaged on snakebite removes the toxin. It reduces dryness of hands and feet. Sesame mixed with flax oil or flaxseed increases sexual energy, using 2 drams. If one eats too much, one gets thirsty and it digests slowly. It is preferable to eat toasted seed for the stomach's sake, mixed with honey. Sesame leaves are classified as wind and damp. The sap of crushed leaves can be drunk or used to wash hair to relieve dryness.

Haybusak (Alishan 1992) is a reprinting of knowledge filtered down to the author during his lifetime [1820–1901], and correctly describes the *knchit* capsule as erect, with a pointed apex and wide belly. He suggests that *tahina* mixed with honey is a good food, soothes stomachache and offers laxative relief. Sesame oil is widely regarded as an effective cough medicine by Armenians.

AGRICULTURE AND PROCESSING, PAST AND PRESENT

AFGHANISTAN AND NORTH-EAST PERSIA

Aitchison (1890) reported that *Sesamum* was cultivated for its seed oil, *rōghan-i-kanjā*, that was used for lamp oil as well as for food. It was usually grown in fields associated with melons and tobacco, as it was a crop that required free irrigation.

ARMENIA: EARLIER PERIODS

An eyewitness (Parrot 1845) at the Araxes Valley north of the river described field crops including cotton, castor, melons, pumpkins, watermelons, tobacco, wheat and barley in the "wide and level basin of the Araxes in which Etchmiadzin is situated. [. . .] The plant, however, which is of the greatest importance to Armenians, on account of their fasts, is the *kunjut*, from the diminutive seeds of which a well-flavoured oil is prepared, and used as a substitute for butter." However, subsequently Stoledova (1929–1930) reported that a mere 0.1% of the land was planted with sesame, and it was only grown in the vicinity of Etchmiadzin.

Hadjinov (1929–1930) reported that sesame,

suited to very hot climates, was planted by intercropping in cotton, vegetable and watermelon fields. Hadjinov construed that Armenia's local genetic material originally arrived there in 41–54 A.D., and when Alexander of Macedon and his soldiers seized Armenia, they anointed themselves with this very expensive oil. He confirmed that a great deal of sesame was planted in the Araxes River valley in earlier days. Armenians planted sesame for its oil, which they used for lamp oil. But when gas was introduced, it replaced sesame oil. The second reason for its decline was that cotton replaced sesame as a cash crop, because it brought a higher price. Records from the 1880's show sesame as the fourth major crop in cultivation, after wheat, barley and cotton. Villagers had oil presses called *zeta hank*, since abandoned.

Hadjinov indicated that the morphology of sesame plants from Afghanistan and Iran differs from Armenian cultivars. The primary dissimilarity is that Armenian sesame has black seed; also the leaves are deeply divided and exceptionally dentate. Armenians planted and harvested sesame later than in those neighboring countries. Hadjinov observed that sesame was grown under basin irrigation and harvested with a scythe.

Hoposian (1980, 2001, pers. comm. 2001) studied Armenia's ruined oil mills where sesame seeds were formerly crushed. He says two types of structures existed: *zeit han*, for extracting oil, and *zeitadoon* [equivalent to Iranian *dahink-hana*], used only for sesame, also found in Nachichevan, Talin. In former times, there were one *zeitadoon* for every 10 villages. Hoposian could find no *zeitadoon* to photograph in recent years; all were abandoned and had collapsed. One can find illustrations of sesame oil processing equipment and workshops in Bulgaria (Gramatikov 1979), India (Eberhardt 1911), and Iran (Wulff 1966).

According to Hoposian, traditional preparation of *tahina* [paste] from sesame seed in Armenia was as follows: First, a batch of sesame seed was soaked in a stone reservoir (500–600 L capacity) containing salt water (approximately 16 kg). This salt water could be reused for an entire season. An egg was placed in the salt water to verify its proper concentration; the egg must float, not sink. When the seed and salt water are mixed, the testae fall off the seed; the hulled seed rise to surface; they are removed by

scooping up with baskets. The heavier testae remain behind in the saline solution.

The hulled seeds were removed and soaked in fresh water for a full day in large stone reservoirs outside the village walls. The following day, the seeds were carried in large wooden containers to another reservoir with a funnel shape and a stopcock that could release the water. The seeds were washed with water several times, and rinsed thoroughly. Elaborate and repeated rinsings were required to remove excess salt from the seeds prior to further processing for confectionery. The seeds were spread on carpets to dry and crushed with rods, then toasted in a fireplace at the *zeitadoon*. A *zeit han* had a fireplace beneath a flat stone enclosed table, where the seeds were placed for toasting. At the *zeitadoon*, pressed dough cakes were toasted first, their ashes swept to one side, then the seeds were placed on the heated stone surface to toast, then allowed to cool.

The toasted crushed seeds formed a dense paste from which oil was extracted by pouring hot water over the mass in a large container; the oil rose to the top and was removed from the surface with a large wooden spoon. The brackish residue was added to soil as fertilizer, because it was too salty for animal feed. Clean cloths were placed repeatedly on the surface of the residue to extract more oil, until none remained.

Hoposian assumed that in recent times, sesame was planted in Armenia between 1935 and World War II, because private, non-governmental cooperatives were established in 1932 for sesame oil processing. However, sesame was gradually replaced by cotton as a major cash crop. Mikhail Asadorich, Director, Institute of Agriculture and Rural Economy, Yerevan (pers. comm. 2001) stated that today none at all is grown in the Republic of Armenia.

IRAQ

An early traveler, Ker Porter (1821–1822) wrote: "The material they set before us to give light, was an oil pressed from a plant called *serzan*, that grows wild in the desert, and which also serves for various other household uses." This observation was made at Howish, along the irrigation canals after Diyala. Semitic language scholar Gonzalo Rubio (Professor of Near Eastern Languages and Cultures, Ohio State University, pers. comm. 2002) agrees that *serzan* is very likely an alternate name for sesame.



Fig. 2. A weighty wooden pestle (or *assaara walad*) used in the crushing of sesame seed. These are often made from the trunk of *Balanites aegyptica* (L.) Del.

Bishop (1891) observed during her visit to Baghdad that “the bazars are pervaded by a pungent odor of hot *sesamum* oil and rancid fat, frying being the usual mode of cooking in these restaurants.”

Today a canning facility in Dohuk, Iraq produces a mere 3–5 tons of sesame oil per year.

SUDAN AND YEMEN: CAMELS PRESS OIL

Zaita alwalad is sesame oil produced by a camel-driven press and specifically that which naturally seeps underneath the *assaara walad* [weighty wooden pestle, often made from the trunk of *Balanites aegyptica* (L.) Del.] (Fig. 2). This *zait* has the most concentrated flavor, and is viewed by Sudanese as the most desirable sesame oil. Camel-driven *asarat* [workshops where seed is crushed] still exist in El Obeid, North Kordofan (Bedigian fieldwork November 2003), and a single *asara* was located in Gedaref, Sudan in 1999. Details about *asarat* in Sudan were communicated previously (Bedigian 1988).

Most of the crushing of sesame seed for oil



Fig. 3. A camel-driven press (or *asara*) used in the manufacture of sesame oil.

is now done by machine, although there were four camel-driven *asarat* in the old sections of Sana’a in 1998, several in the Tihama, and one in Tarim, the historic holy hub of Wadi Hadhramaut. Oil obtained from *asarat* powered by camels is universally regarded as superior, because the grinding process is slow and gentle (Fig. 3).

SYRIA: HARVESTING BY UPROOTING

Harvest techniques in Syria today are akin to SYRIA: those practiced in Armenia a century ago (Halajyan 1973). As stated above, they seem to be a relict of Mesopotamian practice. Manners and Safagi-Negad (1985) concur that one of the characteristics of Middle Eastern society has been the persistence of agricultural patterns and practices. Rooted in the physical environment, these are outcomes of centuries of ecological experimentation and adaptation and represent the efforts of farmers to cope in their semi-arid environment.

Rabo’s (1980) *Change on the Euphrates* includes a photograph, “Threshing of sesame,” that depicts a woman with uprooted stalks at Sabgha location, Southeast of Raqa’a, Syria. Many farmers report that uprooting is simply easier than cutting, unless the earth is very hard. This may be linked to the fact that most sesame grown in Syria is irrigated. Farmers say that harvesting by pulling is easy, although cutting the plants with a knife yields cleaner seed, without soil particles. Sesame is planted as a second crop in May or June, after wheat. It is sometimes intercropped with cotton, sunflower or corn. Syrian cultivars are slow in maturing, requiring five months, in contrast to many varieties this author

has studied in Sudan, Turkey and Yemen. Women generally carry out tasks associated with sesame, but occasionally, during hectic periods, men and women work together.

A tall (c 2-m) and woody variety grows along the banks of the Euphrates. Villagers, who commonly harvest this variety by uprooting, save the spent woody capsules and branches for fuel. These reserves are normally stored outside the earthen wall of the compound, to avert fires. Trees and kindling are extremely scarce in the region; dried sesame stalks are widely used for baking bread in earthen ovens. This practice was observed from the Euphrates to extreme north-eastern Syria (Bedigian fieldwork 1997–2001). Regrettably, the practice of uprooting increases erosion as topsoil blows away on the incessantly windy plain.

TURKEY: PRIMITIVE PLANTING AND PROCESSING

Basgoz (1998) conveys a 13th century manuscript, *Menakib u sheyh Ebülvefa* [The Adventure of Ebülvefa, a mystic], acquainted with how to prepare a field for planting sesame, and how sesame oil is produced thereafter. “When the plants mature, farmers harvest them making small bundles that are tied at the middle and left to dry in the sun. The dried plants are carried to a clean ground, where they are beaten with a stick to separate the seeds from the straw.

“The seeds are washed, cleaned and wrought slightly and placed in a cauldron to boil for a while. They are taken out of the cauldron when it is not hot anymore and wrought again under the feet like dough. Thus the seed becomes oil and increases the taste of our food.”

YEMEN: CHARACTERISTICS OF CROPPING SYSTEMS

There are two distinct regions in Yemen where sesame is cultivated by traditional ways, and in each place the growers, their cultivars, and their overall approaches to sesame farming are dissimilar. The hot and humid Tihama region, a narrow strip of land flanking the Red Sea, has proximity and resemblance to Africa in many ways, as seen in its basketry, dress and house design. Sesame is grown as a rainfed crop, planted by broadcasting very densely, to avoid weeding. No fertilizer is used except (at times) animal dung. Most sesame fields are small patches of about an acre, a small section of larg-

er farms. The local variety, *beledi*, has brown seed, although farmers reported that white seed fetches twice the price as brown, at market. The majority of the land is devoted to millet and sorghum. Some henna is cultivated along borders as a cash crop. Men and women generally work together, planting, cultivating and harvesting sesame. In the system employed, called *khadir* and ‘*afir*, a farmer provides irrigation water, waits about ten days for weeds to germinate, then plows to remove weeds. The crop is sown after this.

The geography and unique hydrology of the isolated Wadi Hadhramaut defines the entire southern region. Spate irrigation waters the crops. These desert rivers and streams are dry during most of the year, but when a storm brings rain it is frequently a heavy downpour that may fill the *wadis* with torrents of more than two meters of water. *Wadi* floods also transport valuable nutrients and bear enormous quantities of leaf litter, that subsequently restore soil fertility. One sees the bases of *Zizyphus* trees growing beside the *wadis* wrapped with debris of vines, branches and twigs, as high as 30 cm from the ground. Most fields are built adjacent to an intricate system of manmade earthen dams and interlocking tributaries of these natural, occasional watercourses.

Sesame is a very important component of the subsistence agriculture practiced in Wadi Hadhramaut. More than half the fields are planted by intercropping. A typical mixture includes sesame, sorghum, millet, a cucurbit, *Citrullus* sp. [Arabic *fagouz*] and a small bean, resembling mung bean [Arabic *digir*]. Other occasionally intercropped vegetables include eggplant, okra, pumpkin and watermelon. These hardy varieties mature, sometimes with no rainfall, except for residual moisture. At Sharyouf, sesame and henna were intercropped; sesame is also frequently sown under date palms. Less commonly, sesame is sown in hedgerows along the edge of a field of sorghum or another crop. The farmer keeps that harvest, without paying taxes. One farm, at Bir Ghasim, had alternating rows of sorghum and sesame, with okra and watermelon growing along the field edges.

An intense, personal relationship between farmers and their crops characterizes the region. Cultivars of sesame are diverse. Seed color varies, as does capsule thickness, morphology [both bicarpellate and tetracarpellate forms ex-

ist], and plant height. Fields are fertilized with animal or human manure. Many farmers harvest sesame by uprooting the entire plant, believing that seed oil content is higher and the taste is sweeter [less bitter] when that method is used. Others prefer to cut with a sickle, because the yield is cleaner, without soil particles. If the soil is too hard, stems must be cut, of necessity. Weeding, harvesting, threshing and winnowing is women's work.

ETYMOLOGY: EARLIEST LINGUISTIC EVIDENCE

Sesame is a likely example of a 'Wanderwort', a traveling name. Blažek and Boisson (1992) reported examples of Mesopotamian agricultural terms that traveled with the objects named. The Sanskrit verb 'til' meaning "to be unctuous, to anoint," is derived from *tīla*, the name for sesame (Monier-Williams 1960).

The Dravidian word for sesame oil, 'el' (Bedigian and Harlan 1986), may well have entered into usage in Mesopotamia as 'ellu,' and it is interesting that the *Oxford English Dictionary* (2001) entry for 'oil' gives the verb 'ele,' meaning 'to anoint'. It seems plausible that the original word referring to sesame oil as THE oil may have been transferred later to the Greek word for olive, 'elaion', when olive oil became the number one oil.

The first entry for *tīla* (Monier-Williams 1960) conveys this meaning: "*Sesamum indicum* (its blossom is compared to the nose Gf. x, 14). Subsequent research led to that 12th century source, Jayadeva's *Gītagovinda*, *Love Song of the Dark Lord* (1977). The passage states:

"Fierce Radha, your eyes glower
Like gleaming dark lotuses;
Your nose is a sesame flower;
Your teeth are white jasmine."

EARLY AND CONTEMPORARY NAMES FROM SOUTHWEST ASIA

Many terms are used for sesame in Southwest Asia. The names gathered here were obtained from published sources including Adjarian (1977), Aitchison (1890), Alishan (1992), Awetik'ian (1979–1981), Basmadjian (1926), Boyajian (1884), Faroukh (1965), Hadjinov (1929–1930), Hübschmann (1897), Iz and Hony (1960), Ker Porter (1821–1822), de Lusignan (1903), Mackenzie (1990), Naim (1931), Seidel (1908), Wehr (1961), and Wilson and Mariam

(1979). The names are: Afghanistan: *kunjit*, *til*; Akkadian: *šamaššammū*; Albanian: *susam*; Arabic: *samsam*, *semsemt*, *semsem*, *serzan*, *sim-sim*, *zinz'lan*, *djouldjoulān*, *zelzlane*, *djyldjylan*, *duhn*; Armenian: *shooshmah*, *soosahm*, *shushmush*, *shushba*, *shushmeesh*, *sousan*, *soomsoom*, *shulkhan*, *k'njoot*, *g'njit*, *k'nchut*, *kunjut*, *kond-jut*, *konjet*, *konjit*, *kanjot*, *konjut*, *knchit*, *knch'it* and *knch'ut*; Coptic: *semsem*; Georgian: *kun-jut'i*; Greek: *sesami*, *sousāmi*, *sesamon*; Middle Greek: *semsem*; Kurdish: *kunjut*, *kunjik*; Persian: *konjut*, *kunjad*, *kunjed*, *konjud*, *knjd*, *ks*; Polish: *sezam*, *sadzamin*, *salscemo*, *cezama*, *cezanna*; Russian: *kunjut*, *konjet*; Serbian: *susam*; Spanish: *ajonjolí*; Turkish: *susam*, *sisam*, *shulkhan*, *kunchu*, *koonjoo*; Uigur: *kunjut*, *kunchi*.

The words that refer specifically to sesame oil are: Arabic: *zeit simsim*; *seereej*; *sirej*; *siraj*, *seerige*; Armenian: *sheerbahat*, *sheerbachtidi*, *shireeg*, *soosami zeit*; Old Armenian: *kheen*; Ethiopia: *salit*; Persian: *roghen*, *roghan*; Polish: *sezamowy*, *sesamowe*.

There seem to be three clusters of terms for sesame in Southwest Asia. The Semitic group arises from the Akkadian *šamaššammū*. The Arabic *simsim* contains a repetition of the basic syllable, *sim*, a phenomenon the author has noticed frequently in its African vernacular names also. Hundreds of names from the published literature, herbarium labels and firsthand conversations with Africans are being examined with Professor Christopher Ehret, African historian and specialist in African languages, UCLA. Concerning this observation Ehret replied (personal communication March 2, 2000), "Reduplication is not unknown in the names of smaller plants. Here we may have the effect, though, of diminutive formation by reduplication, a process found in many languages. Perhaps here it reflects the smallness of the seeds. It's not something I've noticed very often in other food plants."

A second frequently used cluster of sesame names is *kunjut/konjet*, believed to have originated from the Uigur language (Naim 1931), and giving us the Persian name *knjd*. Aitchison (1890), writing about Afghanistan and North Eastern Persia, reported the variants *kanjd*, *kanjī*, *kunjid* and *kunjit*, and the Sanskrit *til*. The former is derived from the classical Armenian, *knch'it'n*, so apparently the words were around in earliest time under that spelling (Awetik'ian [1979–1981], *New Word Book* [originally com-

piled in 1836]; John Greppin, Armenian linguist, Cleveland State University, pers. comm. 2002). *Knch'it* is the classical Armenian word for nose or snout, based on the form of the sesame flower (Fig. 1) and fruit. Art historian Norah Titley's current project is a translation of the *Ni'matnāma* dated ca 1500 A.D., in Persianized Urdu, done in India for the Sultanates, about which she reports: "This is a collection of his recipes for food, perfume, aphrodisiacs, plus advice on betel chewing." "The author uses the name *kunjud* throughout for sesame, and *tī* or *tīy* for sesame seed oil. Roasted sesame seed flour is used in some recipes" (Titley, pers. comm. 2002).

Maïmonides (Meyerhof 1940) considered the name *gulgulan/juljulân* to have been derived from *ğulğul*, small bell, due to the shape of the fruit. This author's own research confirms that root (Bedigian and Harlan 1986). Arabic scholar Charles Perry (personal communication 1995) feels that *juljulân*, the other Arabic word for sesame, was a Yemenite or South Arabian word, which might explain why it shows up in Spain as *ajonjolí*. There were many men of Qais (South Arabians) in the Moorish armies in Spain. The Berber word comes from this, as does the word *gingelly*, used in India. The Portuguese took that word to India. Today standard Portuguese calls sesame either *sesamo* or *gergelim*, but *gengelim*, from the Arabic *juljulân* was also used in earlier times. Ibn Manzur's 17th dictionary, *Lisân al-'Arab* states, "Al-*juljulân*: the fruit of the coriander; and it is said, the seeds c. of the sesame." Abu al Ghauth said, "Al-*juljulân* is sesame in its hull [capsule] before it is harvested." . . . Quoting the poet Waddâh: "the people laughed and said: 'The poetry of Waddâh the Kinanite!' " "My poetry is only salt mixed with *juljulân*." The name *jiljil* is used in Wadi Hadhramaut, not *simsim*, by which it is known in North Yemen.

Gonzalo Rubio, Professor of Near Eastern Languages and Cultures, Ohio State University (personal communication 2002) agrees that the lineage arises from the Semitic *jaljala*, "to resound, to reverberate, to rattle." Considering the crackling sound as the capsules ripen, and the rattling of dry unharvested stalks in the wind, this seems plausible. Rubio maintains that "Ultimately, all these words show the same etymon, a Semitic root **glgl* meaning always: to be round, to turn, etc."

SAUDI ARABIA: A RIDDLE FROM RIYADH

Scott's (1965) analysis of Riyadh Arabic riddles gives three-line riddles with introductory formulas: '*isim/sayyin*.'

"A noun. It is composed of four letters. The first and the second, a thing that causes death. The third and the fourth, like the first [part of the word].—*simsim* [sesame; *sim* is the word for poison]; the reference to the letters is to the written form of the word, in which the vowels are not represented."

And another:

"And which is that thing.

Which, if you eat all of it, you don't die.

If you eat half of it, you die."—*simsim*

[the whole word means sesame; *sim* means 'poison' (*Lisân al-Arab* 1981)].

Sudanese colleague El Siddig M. At-Taras wrote (personal communication 2002), "I have known the riddle since I was very young. It is one of the many riddles that used to be called '*Alahaaqi Algaseerah*,' i.e., the short stories or riddles that grandmothers use as a lullaby."

SUDANESE PROVERB

"Just like sesame, if you don't grind it, you won't get oil" [*zay assimsim lao ma 'asartu maa bijeeb zayt*] (Bedigian 1988; Bedigian and Harlan 1983). Effort is required to obtain a desired result.

CULINARY USE

AFGHANISTAN AND NORTH-EAST PERSIA

Aitchison (1890) reported that the sesame oil was eaten and the seeds, *tukm-i-kanjd*, were much used in confectioneries. Donaldson (1973) stated that in Iran "*halva* is cooked for merit, especially for the dead. Much of it is given away, for in so doing lies much of the merit." Donaldson (1973) also reported "there is a special sweetmeat that is fried in [sesame oil] during the month of Ramadan, and to eat this brings merit."

MEDIEVAL ARABIAN CULINARY USE

Sesame oil was such a prominent ingredient that it had its own name, *sîraj* (which is still used in Arabic, though often pronounced *shîraj*). It was the preferred cooking fat for chicken and the usual fat in making pastries and sweetmeats. It was also a flavoring stirred into pudding.

Some stews called for a mixture of olive and sesame oil (Charles Perry, culinary historian, pers. comm. 2002).

The Medieval Cookbook (Waines 1989) describes the early cooking method 'cooking by exchange': first sauté meat pieces briskly in hot oil to retain their juices and nutritive elements. The medieval cook would, by preference, have used sesame (*shiraj*) or olive oil, although sheep tail fat was also widely used. Then the meat is moistened with water to half its depth or more. Seasonings may be added at either this or the first stage, frequently at both. Other ingredients: vegetables, dried fruit or cheese may be added according the type of dish. The juices sealed inside the meat are gradually released to combine with the cooking liquid and at the same time the meat absorbs and is enriched by the various flavors of the liquid itself. Hence the 'exchange.' An example of this technique is found in the recipe for Isfanakhiya.

Waines (1989) presented a medieval recipe of the spice mixture *za'atar*: "Scented salt was, like the *kmakh* preparations, used both as a seasoning in cooking food and as a condiment at the table." The following: sumac, pomegranate seeds, asafetida, sesame and cumin were added to salt.

Waines (1989) named several dishes that had sesame as an ingredient: *badhinjan mahshi* [sesame oil], *samak mishwa* [sesame oil], *sughdiya* [sesame seed oil], *tirrikh mufarraka* [sesame or olive oil], *samak summaqiya* [sesame paste (*tahina* or *tahini*)], and *hais* [sesame seed oil].

MODERN ARABIAN CUISINE

In Saudi Arabia a shortbread roll filled with a date paste is encrusted with sesame seeds. Sesame brittle manufactured there is also a popular snack in Sana'a, Yemen. Sesame covers cookies called *halaawa Mawlid simsimiyya*, sold in Sudan throughout the festive celebration of Prophet Mohamed's birthday (Bedigian 1988).

The multiple uses of sesame as a condiment retain their popularity in Syrian, Lebanese, Palestinian and Jordanian cuisine today. Mixed with thyme, sour-tasting powdered dried sumac fruit, salt and optional ingredients including crushed pistachio nuts or cumin, the sesame spice blend called *za'atar* is a culturally-defining dish in Syria and Lebanon (Tohfeh Habash, Wilberforce University, personal communication 1996). Local residents dip flat bread into olive

oil and then into this dry spicy sesame mix at breakfast, or sprinkle it on a bread called *men-ayish* in Aleppo, before baking. The popular fritter *falafel* [or *tamia* in Sudan] is prepared by grinding soaked, raw chickpeas, adding parsley, egg, cumin, salt and sesame seeds, forming 3–4 cm wide balls, and frying. Roden (1972) and Salloum (2000) offer a number of classic and imaginative recipes using sesame.

The paste of crushed toasted sesame, *tahina*, with its nutty flavor, is used as a dipping sauce called *taratour*. It can be used as a salad dressing with lemon juice and chili pepper. *Tahina*, mixed with ground chickpeas and garlic, forms a side dish called *hummus*; added to mashed roasted eggplant, it yields *baba ghannouj* [also called *mahshe* or *salata aswad*].

Seema V. Atalla's poem, *Baba Ghannouj* (1995) pays tribute to that recipe as well as to the all-important sesame constituent that flavors it:

"Like a child I ask why
we must crush the garlic
who thought to grind
the **innocent sesame seed**."

ARMENIAN PASTRY

Specialty bread prepared by Armenians during Lent is fashioned by spreading pastry dough with sweetened *tahina*, and rolling it into a slender snakelike cylinder. This is coiled into a flat disc, and baked.

SYRIAN HALWAAH

Sesame literally lends itself, giving substance and flavor, to the sweet called *halwaa*. The Sammour Halvah Company, in Aleppo, Syria, follows this method of preparation (Bedigian fieldwork 1997). Seeds imported from China, Ethiopia, India, Nigeria and Sudan augment the supply from Syria.

Soak seed: Nigerian seed requires only 10–15 minutes in cold water. Ethiopian seed requires up to four hours soaking; Sudanese seed requires up to four hours; Syrian seed requires up to five hours. Put into a basin with salt water [very high concentration, using $\frac{1}{3}$ barrel of salt per full barrel]. Put into a machine to agitate seed to separate testa from embryo. Strain the seed from the salt water: hulled seed float to the top. Wash five times using fresh water.

Heat seed in a water bath under steam pressure for 2.5 hr. Container has 200-kg capacity.

Sesame is dried and toasted here, in preparations of both *tahina* and *halwaa*.

Sieve under vacuum to remove all testae [waste].

Grinding is done by machine; two stones are used, the lower fixed, and the upper rotating. This French stone is very hard, and can last 50 years; simply tap [scarify] the surface every few years, according to wear, to renew abrasions for good grinding.

The same steam that roasted the seeds is used to melt the sugar [1.5 hr]. Next add water and powdered pieces of the stem and root of a native plant, *Saponaria officinalis* L. (*Caryophyllaceae*) [Arabic: *araq halawi* or *shursh halawi*; Bouncing Bet or soapwort] to impart a creamy consistency (Post 1932). Soak in the powdered root and stem for two hours. Add 200 ml of that liquid to 100-kg sugar; add vanilla to taste, and citric acid to retain soft consistency. The melted sugar-*shursh halawi* mixture reaches the consistency of glass, like taffy.

Combine sugar and sesame in equal proportions, by weight. Stir thoroughly. It is essential to know when to stop mixing during this critical step. An experienced worker might complete this step in 15 minutes.

Disposal of the saline testae by-product is a perennial dilemma for the manufacturers. They reported that they could find no safe place to dispose of the steep 15 m tall mounds of discarded salty testae without causing environmental damage. They feared that as the waste heaps outside the factory are not contained, they may eventually contribute to salinity in the region (staff, Sammour Halvah Company, Aleppo, personal communication 1997).

SYRIA: EARLY EYEWITNESS ACCOUNT

Russell (1794), in *Natural History of Aleppo*, wrote: "An oil called *seerige* is prepared from *Sesamum* and much used in Jewish cookery; but it is disagreeably strong both to taste and smell. Some eat it mixed with the inspissated juice of grape, called *dibs*, but very few, except the Jews, use it instead of olive oil." Also about the Jews: "The lower people live chiefly on bread, pulse, herbs and roots, dressed in the expressed oil of *Sesamum*, which is seldom eaten by other inhabitants."

TURKISH SESAME SPECIALTIES: SIMIT AND HALVAH

Turkey's tasty ring-shaped sesame-covered bread rolls, a characteristically Turkish sesame specialty especially ubiquitous in Istanbul, takes its name, *simit*, from sesame. It is so popular that it has been immortalized in verse more than once. Yuesel Soyleme, born in Istanbul, 1931, celebrated the modest sesame seed in this couplet from a poem called *Simit* (PoemFinder, Internet database from Roth Publishing, n.d.):

"Like the *simit*, the sesame
Mother I embrace thee."

Another occurrence in a poem by Sait (1983), "There is a Snake in Alemdağ":

"The evening *simit* had just come out into the world
The *simit* vendor's hawking filled the room."

"In Search of a Story" by Sait (1983) depicts a Turkish landscape that, unsurprisingly, includes *simit*. "Before my eyes flitted bridges, running streams, silent and noisy stations, whistle sounds numbing my nerves and blood, trees knocked down over and over, and planted upright again, porcelain insulators on telegraph poles, *salep* mugs, cups, glasses, stone prayer beads, meerschaum cigarette holders, *simits*, fruit baskets, and baskets of winter cherries."

Turkish merchants in Gaziantep told the author (2001, 2002) that Turkey exports most of its homegrown seed to Japan, and imports sesame intended for *halvah* manufacture from India and Azerbaijan. Childs (1917) reported finding the '*helva* sweetmeat' on his walk across Turkey. "The Bridge" by Sait (1983) celebrates bakers and candy makers:

"Lily-white and rotund candy-sellers with red cheeks. . .
Their hands smelling of sesame *halvah* sliced with the hiss of enormous knives
They are big handsome men like wax Janissary figures
On display at the Military Museum."

YEMEN: USES

Sesame is crushed for oil or eaten as a snack, toasted and salted; it is also sprinkled on *kaghke* [cakes]. Shortly after harvest season, roasted, salted sesame grown in the Tihama is transported up to Sana'a city center, and sold there by young boys.

Sesame oil (see Fig. 5) is an ingredient essen-



Fig. 4. Alexander the Great feeding sesame seeds to birds (British Library version).

tial for making the famous Hadhrami *asid*, a highly valued aphrodisiac. Boiling water is added to dates. The stones are removed from the resulting paste. Wheat flour, sesame oil [*salit*], and tiny [1 mm long] brown unidentified seed called *haithawan* are added, and the mixture is rocked gently with a long-handled paddle for two hours to reach the consistency of taffy; then honey is added.

Medicinal use of sesame in the Tihama includes treatment for cough, hair, face massage, laxative, and anointing a new baby. Weiss (1983) reported an anecdotal account, that people from Hadhramut mix sesame oil and indigo to darken their skin in order to prevent sunburn.

SESAME AS SYMBOL

The language of flowers can be expanded to include fruits and seeds, e.g. dates, grapes, and sheaves of wheat. The sesame plant has several connotations: the capsule yields a bountiful



Fig. 5. A sesame oil merchant.

number of seed; generous oil content represents abundance; and the small size seed denotes something of a tiny size, but very significant. This connotation is celebrated in the ever-popular Sudanese love song, *Simsim El Gedaref*, where sesame as metaphor symbolizes delicate, sweet and fragile (Bedigian 1988; Bedigian and Harlan 1983).

THE INCANTATION OPEN SESAME! AS MAGICAL OPERATIVE

Arabic: *Ifiah yaa simsim!* Farsi: *Konjude baz!* Turkish: *Açıl Susam!* The password "Open Sesame" first appeared in *The Thousand and One Nights*. The phrase refers literally to the capsule's ability to split open, at the slightest touch, when ripe. Its idiomatic meaning designates something that unfailingly brings about a desired end: a key to a mystery, or anything that acts like magic in obtaining a favor, admission, or recognition (Brewer 1895). Ranke's (1977) detailed historical analysis of many versions of the tale and Thiselton-Dyer's (1889) summary demonstrate the appeal of the metaphor 'Open Sesame.' Sesame of the *Arabian Nights* has the

power of opening doors and procuring an entrance into caverns and mountains, and suggests abundance, money, and a magical operative.

SYMBOL OF ABUNDANCE IN PERSIAN MINIATURES

Norah Titley's (1979) *Plants and Gardens in Persian, Mughal and Turkish Art* depicts a Persian miniature titled: Alexander the Great feeding sesame seeds to the birds [Or. 13836 (21b)] from the Sultanate *Sharafnāma* by Nizām [1531–1532], held at the British Library (Fig. 4). The *Sharafnāma* (first of two Alexander poems by Nizām) relates the parleying and battle between Alexander the Great and Darius. This rare illustration depicts an episode in which Darius insulted Alexander by sending him a polo stick and ball, and a bowl of sesame seed, saying that as Alexander behaved like a child he should have the playthings of a child.

"The sesame seed represented the countless soldiers in the great army Darius proposed to send against him. Alexander chose to interpret the gifts in another way, and saw them as omens of victory. To him the polo ball represented the world (i.e. Darius' possessions) which Alexander would draw towards himself with the stick (i.e., by means of his army) as in polo. He threw the seed to birds which pecked every grain from the ground and he told Darius that it would be thus that his soldiers would wipe out the army of Darius. He then sent the messenger back to Darius with a bowl of mustard seed, as a symbol of the number of his own soldiers" (Titley 1979). Symbolism is key here. Sesame and mustard seeds sent by one king to another king represent a threat of invasion with a large army. The miniature portrays this incident with a flock of hoopoes, parrots, pigeons, starlings and crows pecking sesame seed, watched by Alexander and his retinue, while the polo sticks and bowl of remaining seed are in the background.

This subject is very rarely seen (Norah Titley, personal communication 1983, 2002). The only other example is in the Topkapi Sarayi Library, Istanbul (Hazine 776, folio 284b): a Persian manuscript dated 907 AH/1502 A.D. which appears to be in a Shiraz style, and shows a single bird, a cockerel, pecking the seed (Fig. 6). Titley analysed it as "a most interesting *Khamsa* of Nizām dated 907/1502-3 (Shiraz), the miniature is in an in-between style, between the rather chunky late 15th c Turkman and looking forward



Fig. 6. Istanbul version of Alexander the Great feeding sesame to a bird (Topkapi Museum, Turkey).

to the far more elegant style of the early 16th century Shiraz" (pers. comm. 2002).

SYMBOL OF MINUTIAE

"The One Sesame Seed", a fairy tale collected from the Gharbiyyah Province in the Nile Delta by El-Shamy (1980), poses a metaphorical predicament wherein a boy plowing a field sowed it with 12 *ardebs* of sesame seed. When informed that it was not sesame [planting] season, the boy returned and started picking out all the seeds. He recovered 11 *ardebs*. As for the twelfth, it too was full, except that one seed was missing. Here, sesame symbolically represents minutia/trifling/pettiness.

SYMBOL OF BEAUTY IN ARABIC POETRY

Roses are an extremely popular botanical symbol in Southwest Asia. Here, 13th century poet al-Ghassani, represented in a translation by Arberry (1953) in *Moorish Poetry*, immortalizes them. *The Pennants* was an anthology compiled in 1243 by Andalusian and Tunisian scholar Ibn Sa'id 'Ali ibn Musá, [1213–1286 A.D.]. The an-

thers of roses are used here in a lyrical simile to sesame, in the penultimate line:

Others have a golden gleam
In their centres, that would seem
Grains of sesame, heaped up
In the middle of their cup.

SYMBOL OF BEAUTY IN ARMENIAN FOLKSONG

Komitas Vardapet [1869–1935], pen name of Armenian monk and ethnomusicologist Soghomon Soghomonian, was a giant of Armenian sacred and folk music who visited remote regions of Armenia, where he assembled the historical *Folksongs* of the peasants, preserving the melodies and words for future generations. One of these (Komitas 1969) is called ‘Eenchoo Bingol Mdar, Susan Smpoul’ [Why did you go to Bingol, Sesame Flower?] The song is a lament addressing a lovely girl as a sesame flower:

Sesame flower branch, garden’s nightingale,
Why did you go to Bingol?
Sesame flower branch, garden’s nightingale,
You found the garden’s nightingale.

The idiom links a fondness for sesame by local Armenians near Bingol, in Eastern Anatolia, to a girl’s beauty, by comparing it to a sesame inflorescence and to another favorite archetype, the garden nightingale, epitome of the songbird (Št’astný 1995).

SESAME IN SUPERSTITION, OCCULT AND SORCERY APHRODISIAC USE

The ‘Sesame’ entry in *Funk and Wagnall’s Standard Dictionary of Folklore, Mythology and Legend* (1949–1950) states that the aphrodisiac properties of sesame seed have been praised for centuries. The *Kama Sutra* prescribes sesame seeds, especially the covering of the seeds, soaked in sparrow eggs and boiled in milk with sugar and ghee to make a man able to enjoy “innumerable women.” Costa ben Luca, a 9th century Arab physician, prescribed an aphrodisiac remedy from *The Book of Cleopatra* [a mythical source] to one afflicted with impotence, which was found effective: anoint the entire body with a crow’s gall mixed with sesame (Lehner and Lehner 1973; Thorndike 1943).

Lemery’s *Dictionnaire Universel des Drogues Simples* (1760) indicated that it increases semen. Andrews’ (2000) review reports that sesame

seeds are reputed to excite the passions and are believed to have made effective love charms and aphrodisiacs. The Arabs used them as a cure for impotence. They also make appropriate offerings to deities with the power to bestow life and fertility. Hindus offer sesame seeds not only to Lakshmi but also to Gauri, a wife of Shiva, associated with the fertility of the grain and the harvest. Ancient Greeks offered sesame seed cakes to earth goddess Demeter, considering them sexual symbols. People offered them to her at the Thesmophoria harvest festival, with accompanying rites and rituals that honored her fertilizing power.

Schopen (1983) indicated that sesame seed is an aphrodisiac used in Yemen. Yusuf ibn ‘Umar, Sultan of Yemen [Sultan of Yemen, d. ca. 1295] (1951) instructed that sesame fried and eaten with seeds of hemp increases desire [literally, marriage].

A related Armenian relic is the snack food *aghants*, a seed mixture of *Cannabis*, flax, sesame and wheat that is toasted and served on festive occasions, particularly New Year’s Day and at wedding feasts. This use is reminiscent of formulations by Ibn Sina and Al Ansari, [described in the section Medieval Arab Medical Sources], wherein snacks containing sesame seed were viewed as aphrodisiac. *Aghants* refers to any mix of grains or seeds that have been roasted, as it comes from the verb to roast or toast. Basmadjian’s (1926) reissue of the 16th century formulations from *Amirdovlat* includes counsel that a mixture of sesame and flaxseeds increases sexual energy.

During his early travels, Lucas (1911) witnessed *halawa simsimia* [sesame sweetmeats] in Egypt. These were wafers composed of a mass of sesame seeds held together with honey, containing a small amount of hashish appearing as black particles distributed throughout.

FOOD HOSTILE TO SPIRITS

The *Handwörterbuch des deutschen Aberglaubens* (1936/1937) reports that Syrian Christians rub every newborn child with a piece of dough that has been mixed with sesame oil; they fashion a cross out of this dough to hang on the door as protection against the evil eye.

Westermarck (1926) lists sesame as one of the foods, along with milk, pounded rice, sugar, *mastic* (aromatic, astringent resin from *Pistacia lentiscus* L.), agal-wood (resin produced by de-

caying heartwood of *Aquillaria agallocha* Roxburgh) and benzoin (a balsamic resin obtained from *Styrax* L.), used to dispel *jnun* [spirits]. Another formula uses pounded toasted wheat, toasted sesame, benzoin, *mastic*, agal-wood and sugar, mixed with oil.

These data suggest that sesame is another botanical used against the evil eye, in addition to the species reported recently by Pieroni and Giusti (2002). Sesame's place in a ceremony for expiation of guilt in Nuba society was described earlier (Bedigian and Harlan 1983).

PROPHECY AND PURIFICATION BY SMOKE

The *Handwörterbuch des deutschen Aberglaubens* (1931/1932) reveals a form of divination in which either sesame or black poppy seeds are thrown onto glowing coals while magic formulas are spoken; by peering into the smoke one can tell the future.

Hande Birkalan, specialist in Folklore and Anthropology (pers. comm. 2002) described a related practice in Turkey: "My grandmother . . . would go to Misir Çarşısı in Eminonu, Istanbul, and buy a mix of black seeds [*Nigella sativa* L.] and sesame, and reading some *surahs* from the Koran, throw them to the *mangal* where we just made Turkish coffee. The mix would make all these weird sounds as they were sprinkled on the charcoal and this would be the sign of 'killing' the evil eye. Sometimes families used these mixtures in necklaces and let the kids and adults wear them. This is called *üzzerlik*."

Teachings of the Nyingmapa sect of Tibetan Buddhists incorporate an expiatory ritual involving the burning of sesame, mustard, etc. seeds, in connection with the performance of *sadhana* [to develop the mind] (Ko 'n-sprul Blo-gros-mtha -yas 1813–1899).

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